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ABSTRACT OF THE DISCLOSURE

0039 A new and improved process which is effective in removing tungsten residues from a tungsten plug structure after a tungsten etchback process is carried out on the structure. The tungsten plug structure is fabricated by providing a bottom dielectric layer on a substrate, providing a bottom metal layer on the bottom dielectric layer, providing a top dielectric layer on the bottom metal layer, providing a via opening in the top dielectric layer, filling the via opening with tungsten, and removing the excess tungsten layer by tungsten etchback. The process of the invention includes removal of tungsten residues from the tungsten plug structure by application of an oxidant solution to the structure after the excess tungsten layer is etched from the structure and prior to deposit of a top metal layer on the tungsten plugs.